

# New Pressure Tester Helps Fine-Tune Irrigation Systems

**J**ust a quick squeeze of the flexible black tubing in their drip-irrigation systems is all some growers need to estimate water pressure. To reach every thirsty plant, water needs to flow through these hoses, called drip tape, at the correct pressure. In fields and orchards with uneven terrain, correct water pressure is especially critical.

Now, ARS agricultural engineers Dennis C. Kincaid and Thomas J. Trout have invented a portable device that makes it more convenient for growers to spot-check water pressure. The scientists have nicknamed the instrument “the squeezer.” Kincaid is based at the ARS Northwest Irrigation and Soils Research Laboratory, in Kimberly, Idaho. Trout is with the ARS Water Management Research Laboratory, in Parlier, California.

The unit weighs close to a pound, is about the size of a pipe wrench, and is accurate to within the accepted 5 percent. Kincaid and Trout have made prototypes of steel and of aluminum, and they estimate that the squeezer could be manufactured at a reasonable cost.

The squeezer is suitable for drip systems—also called microirrigation systems—that use thin-walled, easily compressed tubing that’s either above ground or buried. Drip systems irrigate an estimated 3 million acres of farmland in the United States.

The new tester isn’t intended to replace today’s permanently installed meters and gauges, but instead is a handy option for special situations. For example, it can be used with temporary drip systems that are pulled up after harvest.

“Growers can easily use the squeezer to verify pressure at different points along the drip lines,” Kincaid notes. Too, consultants or Cooperative Extension irrigation specialists “can carry the tester to inspect permanently installed drip systems,” says Trout. “That’s a practical way to determine whether a system is working properly or is plugged.”

The squeezer works somewhat like a clothespin. Says Kincaid, “First you grip the handles, then adjust them until the two small metal plates—the jaws—fit around the drip tape. Then, you tighten the small wing nut to compress the spring until the alignment indicator shows that you have correctly positioned the squeezer.

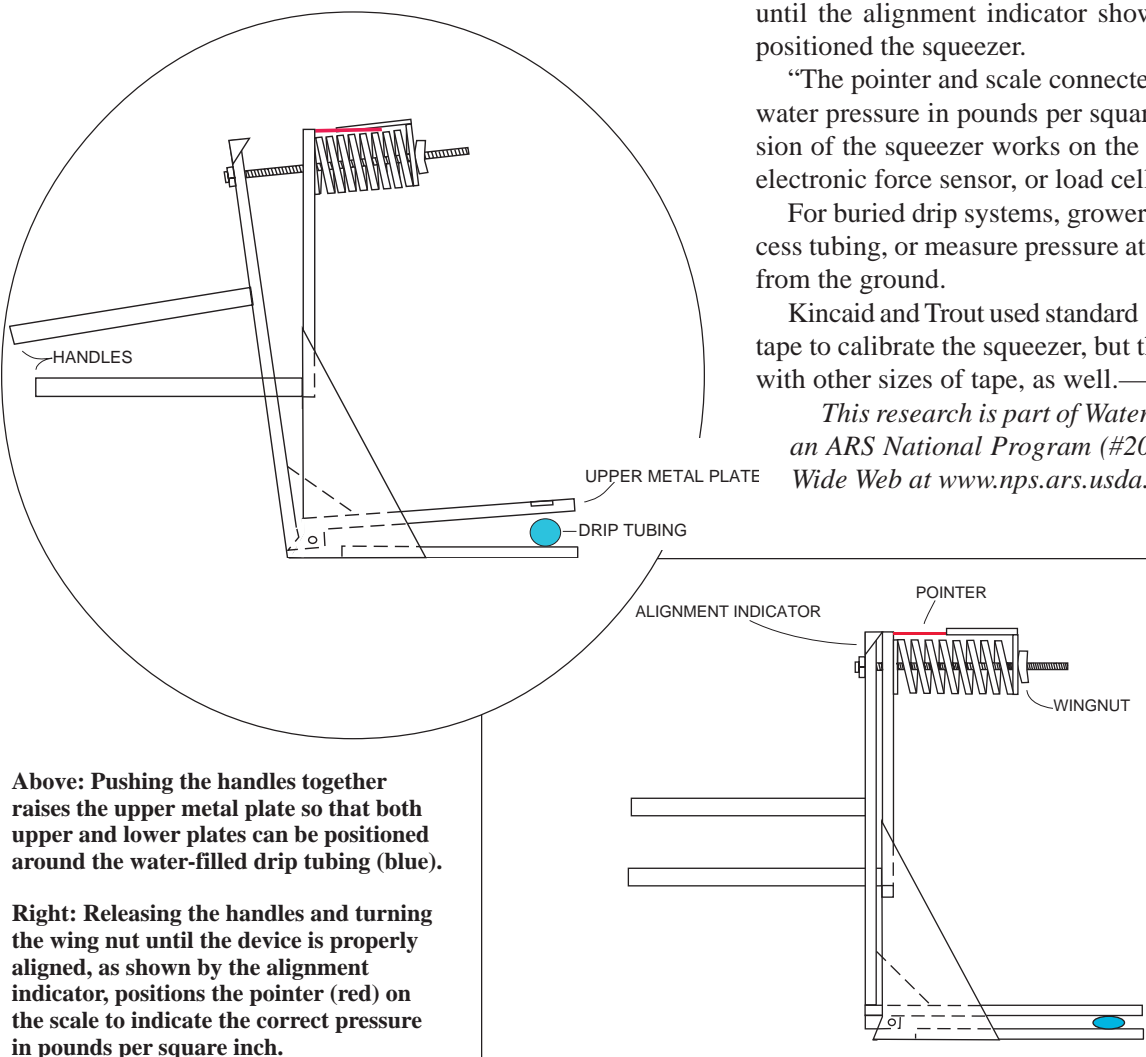
“The pointer and scale connected to the spring indicate the water pressure in pounds per square inch. Our electronic version of the squeezer works on the same principle but uses an electronic force sensor, or load cell, and digital readout.”

For buried drip systems, growers can dig small holes to access tubing, or measure pressure at points where tape emerges from the ground.

Kincaid and Trout used standard 16-millimeter-diameter drip tape to calibrate the squeezer, but they note that it can be used with other sizes of tape, as well.—By **Marcia Wood, ARS.**

*This research is part of Water Quality and Management, an ARS National Program (#201) described on the World Wide Web at [www.nps.ars.usda.gov](http://www.nps.ars.usda.gov).*

*For further information on U.S. Patent Application No. 10/060,467, “Fluid Pressure Measurement by Mechanical Compression of Tubing,” contact Dennis C. Kincaid, USDA-ARS Northwest Irrigation and Soils Research Laboratory, 3793 N., 3600 E., Kimberly, ID 83341; phone (208) 423-6503, fax (208) 423-6555, e-mail [kincaid@nwisrl.ars.usda.gov](mailto:kincaid@nwisrl.ars.usda.gov). ★*



**Above:** Pushing the handles together raises the upper metal plate so that both upper and lower plates can be positioned around the water-filled drip tubing (blue).

**Right:** Releasing the handles and turning the wing nut until the device is properly aligned, as shown by the alignment indicator, positions the pointer (red) on the scale to indicate the correct pressure in pounds per square inch.